



MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

Modules

[Data Structures](#)

[Files](#)

Modules

Here is a list of all modules:

[[detail level 1](#) [2](#) [3](#)]

▼ MIDDLEWARES	
▼ MOTION_TL	
MOTION_TL_Exported_Types	
MOTION_TL_Exported_Functions	



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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Modules](#)

MIDDLEWARES

Modules

MOTION_TL

Detailed Description

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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

Modules

MOTION_TL

MIDDLEWARES

Modules

MOTION_TL_Exported_Types

MOTION_TL_Exported_Functions

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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Data Structures](#) | [Enumerations](#)

MOTION_TL_Exported_Types

[MIDDLEWARES](#) » [MOTION_TL](#)

Data Structures

struct **MTL_input_t**

struct **MTL_output_t**

struct **MTL_AccCal_t**

Enumerations

```
enum MTL_AngleMode_t {  
    MODE_PITCH_ROLL_GRAVITY_INCLINATION,  
    MODE_THETA_PSI_PHI }  
}
```

```
enum MTL_CalPosition_t {  
    X_UP, X_DOWN, Y_UP, Y_DOWN,  
    Z_UP, Z_DOWN  
}
```

```
enum MTL_CalResult_t { CAL_PASS, CAL_NONE, CAL_FAIL }  
}
```

Detailed Description

Enumeration Type Documentation

enum MTL_AngleMode_t

Enumerator	
MODE_PITCH_ROLL_GRAVITY_INCLINATION	
MODE_THETA_PSI_PHI	

Definition at line **83** of file [motion_tl.h](#).

enum MTL_CalPosition_t

Enumerator	
X_UP	
X_DOWN	
Y_UP	
Y_DOWN	
Z_UP	
Z_DOWN	

Definition at line **89** of file [motion_tl.h](#).

enum MTL_CalResult_t

Enumerator	
CAL_PASS	
CAL_NONE	

CAL_FAIL

Definition at line **99** of file **motion_tl.h**.

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MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
Data Structures	Data Structure Index	Data Fields		

[Data Fields](#)

MTL_input_t Struct Reference

[MIDDLEWARES](#) » [MOTION_TL](#) »
[MOTION_TL_Exported_Types](#)

```
#include <motion_t1.h>
```

Data Fields

float **AccX**

float **AccY**

float **AccZ**

float **deltatime_s**

Detailed Description

Definition at line **64** of file **motion_tl.h**.

Field Documentation

float AccX

Definition at line **66** of file [motion_tl.h](#).

float AccY

Definition at line **67** of file [motion_tl.h](#).

float AccZ

Definition at line **68** of file [motion_tl.h](#).

float deltatime_s

Definition at line **69** of file [motion_tl.h](#).

The documentation for this struct was generated from the following file:

- Middlewares/ST/STM32_MotionTL_Library/Inc/[motion_tl.h](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
Data Structures	Data Structure Index	Data Fields		

[Data Fields](#)

MTL_output_t Struct Reference

[MIDDLEWARES](#) » [MOTION_TL](#) » [MOTION_TL_Exported_Types](#)

```
#include <motion_t1.h>
```

Data Fields

float **Angles_Array** [3]

Detailed Description

Definition at line **72** of file **motion_tl.h**.

Field Documentation

float Angles_Array[3]

Definition at line **74** of file **[motion_tl.h](#)**.

The documentation for this struct was generated from the following file:

- Middlewares/ST/STM32_MotionTL_Library/Inc/**[motion_tl.h](#)**



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
Data Structures	Data Structure Index	Data Fields		

[Data Fields](#)

MTL_AccCal_t Struct Reference

[MIDDLEWARES](#) » [MOTION_TL](#) » [MOTION_TL_Exported_Types](#)

```
#include <motion_t1.h>
```

Data Fields

float **offset** [3]

float **gain** [3]

Detailed Description

Definition at line **77** of file **motion_tl.h**.

Field Documentation

float gain[3]

Definition at line **80** of file [motion_tl.h](#).

float offset[3]

Definition at line **79** of file [motion_tl.h](#).

The documentation for this struct was generated from the following file:

- Middlewares/ST/STM32_MotionTL_Library/Inc/[motion_tl.h](#)



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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Functions](#)

MOTION_TL_Exported_Functions

[MIDDLEWARES](#) » [MOTION_TL](#)

Functions

void **MotionTL_Initialize** (void)
Initialize the MotionTL engine. [More...](#)

void **MotionTL_SetOrientation_Acc** (const char *acc_orientation)
Set the MotionTL accelerometer data orientation. [More...](#)

void **MotionTL_Update** (MTL_input_t *data_in)
Run tilt algorithm. [More...](#)

void **MotionTL_GetAngles** (MTL_output_t *data_out, MTL_AngleMode_t angleMode)
Get angles. [More...](#)

uint8_t **MotionTL_GetLibVersion** (char *version)
Get the library version. [More...](#)

void **MotionTL_CalibratePosition** (float calData[][3], uint32_t nRecords, MTL_CalPosition_t calPosition)
Calibrate accelerometer in specific position. [More...](#)

MTL_CalResult_t **MotionTL_GetCalValues** (MTL_AccCal_t *accCal)
Get accelerometer calibration values. [More...](#)

MTL_CalResult_t **MotionTL_SetCalValues** (MTL_AccCal_t *accCal)
Set accelerometer calibration values. [More...](#)

Detailed Description

Function Documentation

```
void  
MotionTL_CalibratePosition ( float          calData[][3],  
                           uint32_t       nRecords,  
                           MTL_CalPosition_t calPosition  
                           )
```

Calibrate accelerometer in specific position.

Parameters

- calData** Pointer to 2D array of calibration data
calData[nRecords][3]
- nRecords** Number of calibration data records (3 axes per
each record)
- calPosition** Calibration position the data belong to

Return values

none

```
void MotionTL_GetAngles ( MTL_output_t * data_out,  
                        MTL_AngleMode_t angleMode  
                        )
```

Get angles.

Parameters

- data_out** Pointer to **MTL_output_t** structure

angleMode Switch mode to return desired angles

Return values

none

MTL_CalResult_t

MotionTL_GetCalValues

(**MTL_AccCal_t** * **accCal**)

Get accelerometer calibration values.

Parameters

accCal Pointer to calibration values structure

Return values

Enum with calibration result

uint8_t MotionTL_GetLibVersion (char * **version)**

Get the library version.

Parameters

version Pointer to an array of 35 char

Return values

Number of characters in the version string

void MotionTL_Initialize (void)

Initialize the MotionTL engine.

Parameters

none

Return values

none

MTL_CalResult_t

MotionTL_SetCalValues

(**MTL_AccCal_t * accCal**)

Set accelerometer calibration values.

Parameters

accCal Pointer to calibration values structure

Return values

Enum with calibration result

void

MotionTL_SetOrientation_Acc

(**const char * acc_orientation**)

Set the MotionTL accelerometer data orientation.

Parameters

***acc_orientation** reference system of the accelerometer raw data (for instance: south west up became "swu", north east up became "ned")

Return values

none

void MotionTL_Update (MTL_input_t * data_in)

Run tilt algorithm.

Parameters

data_in Pointer to accaleration in [g]

Return values

none



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	

Data Structures

Here are the data structures with brief descriptions:

MTL_AccCal_t	
MTL_input_t	
MTL_output_t	



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	

Data Structure Index

M		
M	MTL_input_t	MTL_output_t
	MTL_AccCal_t	
M		



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MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
All	Variables		

Here is a list of all struct and union fields with links to the structures/unions they belong to:

- AccX : [MTL_input_t](#)
- AccY : [MTL_input_t](#)
- AccZ : [MTL_input_t](#)
- Angles_Array : [MTL_output_t](#)
- deltatime_s : [MTL_input_t](#)
- gain : [MTL_AccCal_t](#)
- offset : [MTL_AccCal_t](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
All	Variables		

- AccX : [MTL_input_t](#)
- AccY : [MTL_input_t](#)
- AccZ : [MTL_input_t](#)
- Angles_Array : [MTL_output_t](#)
- deltatime_s : [MTL_input_t](#)
- gain : [MTL_AccCal_t](#)
- offset : [MTL_AccCal_t](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
File List	Globals		

File List

Here is a list of all files with brief descriptions:

[detail level [1](#) [2](#) [3](#) [4](#) [5](#)]

▼ Middlewares	
▼ ST	
▼ STM32_MotionTL_Library	
▼ Inc	
motion_tl.h	Header for motion_gr module



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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Middlewares](#)

Middlewares Directory Reference

Directories

directory **ST**

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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Middlewares](#)

[ST](#)

ST Directory Reference

Directories

directory **STM32_MotionTL_Library**

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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Middlewares](#)

[ST](#)

[STM32_MotionTL_Library](#)

STM32_MotionTL_Library Directory Reference

Directories

directory **Inc**

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MotionTL Software Library

MotionTL Software Library Documentation

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Middlewares](#)

[ST](#)

[STM32_MotionTL_Library](#)

[Inc](#)

Inc Directory Reference

Files

file **motion_tl.h** [code]
Header for motion_gr module.



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
File List	Globals		
Middlewares	ST	STM32_MotionTL_Library	Inc

[Data Structures](#) | [Enumerations](#) | [Functions](#)

motion_tl.h File Reference

Header for motion_gr module. [More...](#)

```
#include <stdint.h>
```

[Go to the source code of this file.](#)

Data Structures

struct **MTL_input_t**

struct **MTL_output_t**

struct **MTL_AccCal_t**

Enumerations

```
enum MTL_AngleMode_t {  
    MODE_PITCH_ROLL_GRAVITY_INCLINATION,  
    MODE_THETA_PSI_PHI }  
}
```

```
enum MTL_CalPosition_t {  
    X_UP, X_DOWN, Y_UP, Y_DOWN,  
    Z_UP, Z_DOWN  
}
```

```
enum MTL_CalResult_t { CAL_PASS, CAL_NONE, CAL_FAIL }  
}
```

Functions

void **MotionTL_Initialize** (void)
Initialize the MotionTL engine. [More...](#)

void **MotionTL_SetOrientation_Acc** (const char *acc_orientation)
Set the MotionTL accelerometer data orientation. [More...](#)

void **MotionTL_Update** (MTL_input_t *data_in)
Run tilt algorithm. [More...](#)

void **MotionTL_GetAngles** (MTL_output_t *data_out, MTL_AngleMode_t angleMode)
Get angles. [More...](#)

uint8_t **MotionTL_GetLibVersion** (char *version)
Get the library version. [More...](#)

void **MotionTL_CalibratePosition** (float calData[][3], uint32_t nRecords, MTL_CalPosition_t calPosition)
Calibrate accelerometer in specific position. [More...](#)

MTL_CalResult_t **MotionTL_GetCalValues** (MTL_AccCal_t *accCal)
Get accelerometer calibration values. [More...](#)

MTL_CalResult_t **MotionTL_SetCalValues** (MTL_AccCal_t *accCal)
Set accelerometer calibration values. [More...](#)

Detailed Description

Header for motion_gr module.

Author

MEMS Application Team

Version

V1.0.0

Date

01-May-2017

Attention

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Definition in file [motion_tl.h](#).



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MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
File List	Globals			
All	Functions	Enumerations	Enumerator	

Here is a list of all functions, variables, defines, enums, and typedefs with links to the files they belong to:

- CAL_FAIL : [motion_tl.h](#)
- CAL_NONE : [motion_tl.h](#)
- CAL_PASS : [motion_tl.h](#)
- MODE_PITCH_ROLL_GRAVITY_INCLINATION : [motion_tl.h](#)
- MODE_THETA_PSI_PHI : [motion_tl.h](#)
- MotionTL_CalibratePosition() : [motion_tl.h](#)
- MotionTL_GetAngles() : [motion_tl.h](#)
- MotionTL_GetCalValues() : [motion_tl.h](#)
- MotionTL_GetLibVersion() : [motion_tl.h](#)
- MotionTL_Initialize() : [motion_tl.h](#)
- MotionTL_SetCalValues() : [motion_tl.h](#)
- MotionTL_SetOrientation_Acc() : [motion_tl.h](#)
- MotionTL_Update() : [motion_tl.h](#)
- MTL_AngleMode_t : [motion_tl.h](#)
- MTL_CalPosition_t : [motion_tl.h](#)
- MTL_CalResult_t : [motion_tl.h](#)
- X_DOWN : [motion_tl.h](#)
- X_UP : [motion_tl.h](#)
- Y_DOWN : [motion_tl.h](#)
- Y_UP : [motion_tl.h](#)
- Z_DOWN : [motion_tl.h](#)
- Z_UP : [motion_tl.h](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
File List	Globals			
All	Functions	Enumerations	Enumerator	

- [MotionTL_CalibratePosition\(\)](#) : [motion_tl.h](#)
- [MotionTL_GetAngles\(\)](#) : [motion_tl.h](#)
- [MotionTL_GetCalValues\(\)](#) : [motion_tl.h](#)
- [MotionTL_GetLibVersion\(\)](#) : [motion_tl.h](#)
- [MotionTL_Initialize\(\)](#) : [motion_tl.h](#)
- [MotionTL_SetCalValues\(\)](#) : [motion_tl.h](#)
- [MotionTL_SetOrientation_Acc\(\)](#) : [motion_tl.h](#)
- [MotionTL_Update\(\)](#) : [motion_tl.h](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
File List	Globals			
All	Functions	Enumerations	Enumerator	

- [MTL_AngleMode_t](#) : [motion_tl.h](#)
- [MTL_CalPosition_t](#) : [motion_tl.h](#)
- [MTL_CalResult_t](#) : [motion_tl.h](#)



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MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files	
File List	Globals			
All	Functions	Enumerations	Enumerator	

- CAL_FAIL : [motion_tl.h](#)
- CAL_NONE : [motion_tl.h](#)
- CAL_PASS : [motion_tl.h](#)
- MODE_PITCH_ROLL_GRAVITY_INCLINATION : [motion_tl.h](#)
- MODE_THETA_PSI_PHI : [motion_tl.h](#)
- X_DOWN : [motion_tl.h](#)
- X_UP : [motion_tl.h](#)
- Y_DOWN : [motion_tl.h](#)
- Y_UP : [motion_tl.h](#)
- Z_DOWN : [motion_tl.h](#)
- Z_UP : [motion_tl.h](#)



MotionTL Software Library

MotionTL Software Library Documentation

Main Page	Modules	Data Structures	Files
File List	Globals		
Middlewares	ST	STM32_MotionTL_Library	Inc

motion_tl.h

[Go to the documentation of this file.](#)

```
1 |
38 | /* Define to prevent recursive inclusion ---
   | ----- */
39 | #ifndef _MOTION_TL_H_
40 | #define _MOTION_TL_H_
41 |
42 | #ifdef __cplusplus
43 | extern "C" {
44 | #endif
45 |
46 | /* Includes -----
   | ----- */
47 | #include <stdint.h>
48 |
61 | /* Exported constants -----
   | ----- */
62 |
63 | /* Exported types -----
   | ----- */
64 | typedef struct
65 | {
66 |     float AccX;           /* Acceleration in X
   |     axis in [g] */
```

```

67 | float AccY;          /* Acceleration in Y
    | axis in [g] */
68 | float AccZ;          /* Acceleration in Z
    | axis in [g] */
69 | float deltetime_s;  /* Time between 2
    | library calls in [s] */
70 | } MTL_input_t;
71 |
72 | typedef struct
73 | {
74 |     float Angles_Array[3]; /* Either pitch,
    | roll and gravity inclination or theta, psi and
    | phi */
75 | } MTL_output_t;
76 |
77 | typedef struct
78 | {
79 |     float offset[3];
80 |     float gain[3];
81 | } MTL_AccCal_t;
82 |
83 | typedef enum
84 | {
85 |     MODE_PITCH_ROLL_GRAVITY_INCLINATION, /*
    | pitch, roll and gravity inclination */
86 |     MODE_THETA_PSI_PHI /* theta, psi and phi
    | */
87 | } MTL_AngleMode_t;
88 |
89 | typedef enum
90 | {
91 |     X_UP,
92 |     X_DOWN,
93 |     Y_UP,
94 |     Y_DOWN,
95 |     Z_UP,
96 |     Z_DOWN

```

```

97 } MTL_CalPosition_t;
98
99 typedef enum
100 {
101     CAL_PASS, /* Calibration passed */
102     CAL_NONE, /* Calibration not finished or
not performed at all */
103     CAL_FAIL /* Calibration failed */
104 } MTL_CalResult_t;
105
110 /* Exported variables -----
----- */
111 /* Exported macro -----
----- */
112
117 /* Exported functions -----
----- */
118
124 void MotionTL_Initialize(void);
125
131 void MotionTL_SetOrientation_Acc(const char
*acc_orientation);
132
138 void MotionTL_Update(MTL_input_t *data_in);
139
146 void MotionTL_GetAngles(MTL_output_t
*data_out, MTL_AngleMode_t angleMode);
147
153 uint8_t MotionTL_GetLibVersion(char
*version);
154
162 void MotionTL_CalibratePosition(float
calData[][3], uint32_t nRecords,
MTL_CalPosition_t calPosition);
163
169 MTL_CalResult_t
MotionTL_GetCalValues(MTL_AccCal_t *accCal);

```

```
170
176 MTL_CalResult_t
    MotionTL_SetCalValues(MTL_AccCal_t *accCal);
177
190 #ifdef __cplusplus
191 }
192 #endif
193
194 #endif /* _MOTION_TL_H_ */
195
196 /***** (C) COPYRIGHT
    STMicroelectronics *****/
```